BLACKWATER BOTTOMLAND HARDWOODS (EVERGREEN SUBTYPE)

Concept: Blackwater Bottomland Hardwoods are forests of blackwater river terraces and floodplain ridges, generally dominated by wetland oaks. The Evergreen Subtype covers examples on high to medium-height ridges and terraces that have a substantial component of *Quercus virginiana* or *Chamaecyparis thyoides*. This subtype is known to occur in North Carolina only on the Waccamaw River and its tributary Juniper Creek.

Distinguishing Features: Blackwater Bottomland Hardwoods are distinguished by dominance or codominance by bottomland oaks on blackwater river floodplains, in sites where overbank flooding is, or has been, a significant ecological influence. The Evergreen Subtype is distinguished from all other subtypes by having *Quercus virginiana* or *Chamaecyparis thyoides* present. The Evergreen Subtype is distinguished from Coastal Fringe Evergreen Forest and Swamp Island Evergreen Forest by having floodplain species such as *Quercus laurifolia* and *Vaccinium elliottii,* by having acidic wetland species such as *Chamaecyparis thyoides,* and by generally lacking the drier upland species such as *Quercus hemispherica* and *Quercus geminata*. It can usually be distinguished by its topographic setting, but the Swamp Island Evergreen Forest occurs on some higher ridges on terraces along the Waccamaw River in close proximity to Blackwater Bottomland Hardwoods.

Synonyms: *Pinus taeda - Quercus laurifolia - Chamaecyparis thyoides - (Quercus virginiana) / Vaccinium elliottii* Forest (CEGL007548).
Ecological Systems: Atlantic Coastal Plain Small Blackwater River Floodplain Forest (CES203.249).

Sites: Blackwater Bottomland Hardwoods occur on larger blackwater river floodplains. The Evergreen Subtype occurs primarily on terraces but may occur on higher ridges in the active meander belt.

Soils: The Evergreen Subtype occurs on sandy alluvial soils. Most are mapped as Muckalee (Typic Fluvaquent).

Hydrology: The Evergreen Subtype is intermittently flooded. Flooding probably occurs only in the highest floods and only for relatively brief periods. Soils may also sometimes be saturated by floods that don't inundate them. When the river is not in flood, the sites are well drained.

Vegetation: The Evergreen Subtype is a forest typically dominated by *Quercus laurifolia*. *Pinus taeda* is usually present and sometimes codominates. *Chamaecyparis thyoides* or *Quercus virginiana*, often both, are widely distributed in stands. They seldom occur together in the limited number of plots but can be observed in close proximity. Other canopy species that are frequent and sometimes abundant are *Acer rubrum, Liquidambar styraciflua,* and somewhat less frequently, *Quercus nigra, Taxodium ascendens,* and *Nyssa biflora*. The understory is usually dominated by *Quercus laurifolia,* but *Ilex opaca, Persea palustris, Magnolia virginiana,* or tall *Cyrilla racemiflora* may have high cover. The shrub layer is often moderate to fairly dense. *Vaccinium elliottii* is most often dominant. Other frequent species, sometimes locally abundant, include *Clethra alnifolia, Lyonia lucida, Eubotrys racemosa, Hypericum hypericoides,* and *Ilex myrtifolia*.

Drier areas may have some *Vaccinium arboreum* or *Symplocos tinctoria*. Less frequent but notable species include *Sabal minor, Vaccinium formosum, Ilex decidua,* and *Diospyros virginiana*. Vines are common, though they are less prominent and less diverse than in wetter subtypes. Frequent species includer *Smilax laurifolia, Smilax rotundifolia, Smilax walteri, Smilax glauca, Muscadinia rotundifolia, Gelsemium sempervirens,* and *Toxicodendron radicans*. The herb layer is generally sparse. The only species with high constancy in CVS plot data are *Mitchella repens* and epiphytic *Tillandsia usneoides*. Fairly frequent in plots or observations are *Osmunda spectabilis, Lorinseria areolata, Anchistea virginica, Centella asiatica,* and *Zephyranthes atamasca*. *Sphagnum* is often present in scattered clumps. Other hers that are less frequent but may be characteristic include epiphytic *Pleopeltis michauxiana*, *Chasmanthium laxum, Dichanthelium dichotomum* var. *dichotomum, Carex glaucescens, Carex verrucosa, Carex debilis, Rhynchospora perplexa*, and other species of *Carex* and *Rhynchospora*.

Range and Abundance: Ranked G2?, but the question mark probably is not needed. As far as is known, this community occurs only along the Waccamaw River and Juniper Creek, in North and South Carolina. The well-drained sites are suitable for loblolly pine plantation, and many examples have been converted.

Associations and Patterns: The Evergreen Subtype occurs as part of a floodplain mosaic of communities on the Waccamaw River, along with the Low and Swamp Transition Subtype and Cypress–Gum Swamp. It seems to take the place of the High Subtype along other rivers. Conceptually it grades to the Low Subtype.

Variation: Two variants are recognized, based on wetness.
1. Live Oak Variant occurs on the higher areas. *Quercus virginiana* is present but *Chamaecyparis thyoides* may be present or absent.
2. Atlantic White Cedar Variant occurs on somewhat lower areas. *Chamaecyparis thyoides* is common and *Quercus virginiana* is usually absent. *Taxodium ascendens* may also be present in these communities, though they occur at higher elevations than the Swamp Transition Subtype. While this variant is interpreted as part of the Evergreen Subtype, it may be more like the Low Subtype in wetness. It may warrant recognition as a new subtype that is analogous to the Low Subtype in the same way that the Evergreen Subtype is analogous to the High Subtype.

Dynamics: Dynamics of the Evergreen Subtype are probably largely similar to other floodplain communities, especially to the High Subtype. As with the High Subtype, it is dry enough of the time that fire is a possibility, and pines, when present, would provide flammable litter. However, individual patches are small and are separated by vegetation that is less flammable. The lack of a continuous flammable landscape presumably makes natural fire a rare event.

The factors that lead to the formation of this subtype on the Waccamaw River and not on other rivers are not known. Possible causes include the specific flood regime of the Waccamaw River, the elevation of the terraces relative to the river, the large size of the terraces, or something related to the nature of the alluvium. A number of species are shared with nonriverine wetlands, more than in other blackwater floodplain communities. This may suggest a reduced influence of flooding, though the community's affinities are still more with floodplains than any other setting. At the same time, the mix of species includes ones with an unusually wide range of moisture tolerances,

including a number that suggest wetter conditions than would be expected given the elevation above the river and the sandy soil.

The southerly location may also be important. *Quercus virginiana* is largely confined to maritime settings in North Carolina and does not range this far inland farther north. Nevertheless, while *Quercus virginiana* is common along rivers in states farther south, communities with this composition are not known. The occurrence of *Chamaecyparis* is notable. Populations of this species to the north are in nonriverine wetlands with organic soils. Populations to the south are along small streams with mucky soils. The occurrence on sandy mineral soils on the large floodplain of the Waccamaw River is unlike either.

The mechanism for coexistence of shade-intolerant pines with more shade-tolerant oaks in the High Subtype and Evergreen Subtype, as in maritime forests and a few other communities, is not well known. The question is more complex for the Evergreen Subtype, where the dynamics of the generally short-lived *Chamaecyparis* and means for its coexistence need explanation.

Comments: Though *Quercus laurifolia* is indicated as the dominant oak species, the identity of the laurel oaks on the Waccamaw River is somewhat uncertain. They seem different from the species elsewhere, with smaller and narrower leaves. A few observers have interpreted them as *Quercus hemispherica*, and many have noted their unusual character.

Rare species:
Vascular plants: *Hymenocallis pygmaea* and *Rhynchospora decurrens.*

References: